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UNITED STATES DEPARTMENT OF AGRICULTURE

FOREST SERVICE

BRANCH OF RESEARCH

MONTHLY REPORT

OF

FOREST EXPERIMENT STATIONS
FOREST PRODUCTS
FOREST ECONOMICS
RANGE RESEARCH

AUG 1930

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BRANCH OF RESEARCH

August, 1930

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FOREST EXPERIMENT STATIONS

ALLEGHENY FOREST EXPERIMENT STATION (July and August)

General

The Forester has formally established the Kane Experimental Forest under Regulation L-20, but the fire situation on the Allegheny Forest prevented the Director and Supervisor Bishop from establishing the boundaries.

The six months' limitation on the employment of temporary help necessitated our dropping Miss Adelmann from the roll, although the Station has sufficient statistical material still unanalyzed to keep two computing clerks busy yearlong. Mr. E. S. Cary, a Cornell forester in the 1930 class, reported as field assistant; his employment by us for the summer is an earnest of future close contact with the Pocono Lake Preserve, for which he will become the forester after he leaves us.

The University has definitely assigned to us a laboratory on the first floor of the Botany building, and two office rooms in a dwelling house on Walnut Street directly back of our present quarters.

We are considerably elated to learn that so eminent an authority on soil acidity as Dr. E. T. Wherry of Washington has accepted the vacancy on the botanical staff created by the death of Dr. Harshberger.

Forbes attended the summer meeting of the Pennsylvania Academy of Sciences at Erie, and found the vegetation of Presque Isle to be of extreme interest. Under the direction of Dr. Jennings of our Advisory Council, who is also director of the University of Pittsburgh summer school on the Isle, the academicians visited stands of red oak of fine development both in diameter and height growing on soils which 200 years ago were occupied only by such species of vegetation as Arctostaphylos, and which 500 years ago were well under the waters of Lake Erie! An invitation to speak before the Pocono Forestry Association gave Forbes the opportunity to become somewhat acquainted with the cutting operations of the Pocono Lake Preserve; mine prop cuttings directed against poor species and undesirable specimens of good species of northern hardwoods have so far resulted in very little reproduction visible above the brush. Another five years, however, may tell another story. The marking was done by Joshua Cope of Cornell. Forbes spent a day with Professors Spaeth and Hosmer on Arnot Forest (Cornell University) where a number of

(Over)

small cuttings have been made in a forty-five year old stand of northern hardwoods. Although the composition differed somewhat from our own Little Arnot experimental plots, the chief difference between the two tracts lies in the visibly better growth of the Pennsylvania area.

Forbes, Wood, Schnur, and McComb attended the summer meeting of the Allegheny Section at State College. The Section was shown a substantial amount of experimental work, some of it dealing with such fundamental matters as soil acidity, which is being conducted by the College and by the Department of Forests and Waters and the Rockview Penitentiary. Professor Lutz of the College is using our field house at Camp Ockanickson while on some personal work in the nearby Plains.

The Director and Hough's crew had a taste of fire fighting on the Allegheny Forest, where the prolonged summer's drought had created dangerous conditions. Employment of 200 or 300 men on some of the fires near Warren has not been an uncommon occurrence. A portion of the hemlock plantation made at our instance near Wetmore was burned over in one fire. Although the drought was widespread through our territory, Wood was surprised to find on his return to Camp Ockanickson after a month's absence that local showers had kept the rainfall there close to normal.

Forestation

Wood's recount of the Camp Ockanickson plantations shows satisfactory survival among all species which were not handicapped by original poor condition of the stock or rodent damage soon after planting. Reexamination of these irregularly spaced plantations has not proved difficult, even though tags have been removed from a few of the more accessible stakes marking the location of seedlings. Soil moisture determinations at 24 points in the plantations were made twice during July.

Management

Wood and McComb completed rodent-proof seed traps of about 600 square feet each under two chestnut oak seed trees at Camp Ockanickson. Another fair crop of chestnut oak acorns is in prospect, and will be the third for which we have data. Height, age, and crown data were collected for all of the oak seed trees on the experimental forest.

McComb's analysis of the measurements of 85 chestnut oak seedlings obtained from acorns of different weights shows that at the end of the first year acorns averaging 9.4 grams in weight produced seedlings having a height of 5.7 inches, a shoot weight of .72 grams, and

a plant weight of 3.8 grams; acorns averaging 3.5 grams produced seedlings with measurements of 4.0 inches, .33 grams, and 1.3 grams. The two lots of large and small acorns when graded according to size fall into a quite regular progression with respect to height of shoot, and weight of shoot and of whole plant. Half the seedlings were left in the ground for future observation.

Hough reexamined the reproduction quadrats on certain of the Little Arnot plots, and supplemented his age data among the smaller trees. The need for continuous and unremitting supervision of method-of-cutting plots is well illustrated by the disappearance of some of our photo stakes and the cutting of a few small trees, in the check plot.

The big job of the summer has been the examination of the virgin timber area of the Central Pennsylvania Lumber Company on East Tionesta Creek, south of Wetmore and Ludlow. Hough selected an excellent camp site fairly close to the center of this tract, and with the help of Morey, Berg, and Cary, has done enough work on the five mile road leading from Ludlow to make the camp accessible. We are prepared to use this camp for two or three more seasons, by which time the timber will all have been cut except, we hope, for a Research Reserve. None of this tract is now owned by the Federal Government. In spite of interruptions occasioned by fire fighting and road work, the men have run a painstaking five per cent cruise on four lots of 250 acres each; this is nearly 6 miles of line at 20 chain intervals, changing the tally sheet at the end of every chain; reproduction has been recorded by the Appalachian system, and a good deal of supplemental information has been obtained.

The tract consists of about 3,000 acres, and the only cutting has been for black cherry and one or two other hardwood species; owing to the uneven distribution of these species portions of the tract have hardly been touched at all, while others have had as many as a dozen trees to the acre removed. Considerable areas show no sign whatever of fire, either in the form of fire scars on standing trees or charcoal in the surface layers of the soil. Windthrow is common nearly everywhere, but appears to have reached catastrophic proportions only here and there. A particularly fine growth of black cherry and ash seems to have followed a severe blow-down about 110 years ago, extending over perhaps 100 acres; this should furnish volume table measurements for the larger diameters of second-growth species. Although the stands are by no means pure, there is a distinct tendency toward group occurrence; that is, five or ten acres running heavily to hemlock will be bordered by a smaller acreage running heavily to beech or hard maple. Only on particularly steep slopes or comparatively swampy areas are these three species supplemented by birches, cherry, cucumber, and soft maple in any considerable numbers. One particular

lot of 250 acres at the very head of Cherry Run will not be logged before 1933, according to the C. P. L. authorities, and seems to embrace a sufficient variety of composition and topography to be desirable as a Research Reserve. The owners have been told of the experiment station's interest in the tract.

Mensuration

Schnur practically completed his paper on converting factors, both those obtained in northern hardwoods at Westline and in oak at Cornwall-on-the-Hudson.

Morey and Berg obtained a large amount of height, butt taper, and age data at Heart's Content. A large number of seedling measurements are included, which will enable us to establish the total age of trees for which we have stump analyses. They sawed out sections from ten hemlocks, the oldest about 450 years, and will ship these to Dr. Douglass with information and photographs of their immediate surroundings. A few sections will also be sent from the East Tionesta tract, one of them over 500 years old.

Types

Wood, Schnur, and McComb, accompanied part of the time by Forbes, spent four weeks supplementing our data on white pine in virgin stands. Although data obtained from old stump lands were by no means conclusive, because of the poor condition of the stumps, it certainly looks as if evenness of age characterized the white pine of Clearfield and Clarion Counties, both of which are further from the edge of the western limit of white pine in our latitude than were the stands examined in 1928. A large sample was obtained on the Moshannon State Forest, and at least the approximate age of the stumps determined in several instances. Second growth stands nearby were quite uniformly even-aged, or fell into two or three definite age classes which had resulted either from fires or periodic seeding. Seven strip acres were tallied in Cook Forest, the virgin area recently acquired by the State, in part through public subscription. Age counts were difficult to obtain in such large timber, and the cores have not all been analyzed as yet. Six trees showed a spread in age of only 239 to 261 years. Fairly good evidence was obtained that a few veterans are about 450 years old. In spite of statements made in some quarters that the Cook Forest timber is merely "very old second growth" it is interesting to note that the range of age at Heart's Content was from 235 to 285 years, and that the basal area per acre of white pine alone in Cook Forest exceeds the basal area for all species in the heaviest stands measured in Heart's Content. The seven acres in Cook Forest average 172 square feet per acre of white pine, 100 square feet of hemlock, 3.5 square feet of beech, and one

square foot each of red maple and black birch; these firgures are for trees ten inches in diameter and up. Cook Forest is doomed to extinction as a result of inescapable recreational use.

The number of rings in the sapwood of white pine were counted for a considerable number of trees, both virgin and second growth, in order to obtain a correction for the age of stumps from which the sapwood had weathered. Unlike the planted walnut reported on recently by the Central States Station, white pine appears to vary widely in number of sapwood rings. A preliminary summary shows that there are ten to twenty-three rings of sap on second growth trees, and fourteen to forty-four on virgin trees, the latter with a mode at forty.

The type committee for the Alleghany Section, under Forbes' chairmanship, succeeded in cutting down the number of types for our region to fourteen, but Forbes was told by chairman Hawley of the main Society committee, whom he met at Ithaca, that the total number of types for the East is likely to be nearly 125.

Pathology

During the early part of August, Dr. Hartley and Jackson made a general survey of problems on forest tree diseases occurring in the States of New Jersey, Delaware, and Maryland. As a preliminary reconnaissance for the problem on decay of oak in stands originating as stump sprouts, special efforts were made to locate stands of sprout oaks which had no fire history.

At Trenton they visited the office of State Forester Wilber and were personally directed through the State by Mr. Moore of that office. Inspection was made of tree diseases at the state nursery, state forests, and various forest plantings.

They stopped at the office of State Forester Taber of Delaware and also investigated the state nursery located near Milford. At Baltimore, they saw State Forester Besley, who later furnished us with a list of about forty cutting operations on areas which were chiefly oak. This list will be a distinct aid in our study of decay in oak sprout stands.

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APPALACHIAN FOREST EXPERIMENT STATION

General

Director Demmon of the Southern Station spent a week at Asheville while enroute from Washington to New Orleans. Trips were

made to the Bent Creek experimental forest and to the Mount Mitchell and Biltmore plantations. On August 25 Demmon and Frothingham spoke on forest fire research at the Forest Fire Conference held at Ridgecrest, N. C., under the auspices of the North Carolina State Forest Service. Professor R. C. Hawley, R. M. Evans, Lenthal Wyman, and Dr. L. J. Pessin visited the Station to discuss with members of the Appalachian Section forest type committee the proposed classification of all eastern forest types. They also visited the areas at Bent Creek that were being marked for experimental cutting.

Damage from the 1930 Drought

At the close of the month of August considerable precipitation deficit exists through the Southern Appalachian region. At Asheville, N. C., the deficit is 15 inches, which is slightly greater than for the same period in the drought year of 1925. The precipitation to date is only 45 per cent of the mean for 27 years. Premature leaf fall and considerable browning of foliage on trees growing on shallow rocky soil is in evidence in the mountain forests. At Harrisonburg, Va., the deficiency is 19 inches and although complete records have not yet been compiled for the region, drought injury to the forests of western Virginia will undoubtedly be the most severe on record. On August 26, Hursh and Sims observed an area on the Shenandoah National Forest where drought damage exceeded in severity any observed elsewhere. In this instance several hundred acres of the upper slope chestnut oak type were completely browned, the leaves holding tightly to the stems.

Fire Damage

On completion of the field observations on the 1930 spring burn near McFalls Creek, Natural Bridge National Forest, Hursh, Nelson, Sims, and Phelps visited a number of other areas in Virginia which had been severely burned during 1930. The spring fires occurred during April, following an unusually dry period in February and March, and were particularly destructive.

The continued drought conditions through western Virginia during the summer led to the occurrence of many very disastrous summer fires. In many cases complete killing of the stands resulted. In some instances a summer fire passing over an area burned the surface litter and killed all green foliage without consuming it. A second fire, or the same fire resweeping the area, sometimes occurred, completely consuming all organic material on the forest floor, all foliage, and large numbers of the small trees. On such areas the prolonged summer drought has had a marked desiccating effect on the exposed mineral soil.

Soil samples were collected on several areas for the purpose of determining the influence of such complete burns upon the normal

biological activity in the surface soil.

Erosion of the soil following the removal of the litter layer was also studied and considerable attention was paid to the course of decomposition of additions to the organic matter on the forest floor following the fire.

Most of the spring fires occurred just after the leaves had begun to unfold and, contrary to the general rule in the Southern Appalachians, resulted in almost complete killing of the stands. Sprouting occurred at the base of the trees where the cambium had been completely killed around the stem. Where the cambium had not been completely killed but where the heat had been sufficient to kill the opening buds, adventitious sprouting occurred in the crowns. Data were obtained on the sprouting ability of different species by size classes.

A detailed study of basal wounding caused by fire was also begun. Three degrees of fire intensity were recognized from the evidence on the outside bark - scorching, charring, and burning. Trees on which the outside bark had been burned usually had all three conditions present. Each of these was outlined with chalk on the bark and the outlined areas plotted on special forms. The extent of the wound or killed cambium was ascertained by partially peeling the tree and the limits of the wound were then plotted on the same form. The size of the wounded area will be correlated with the area of discoloration on the outer bark. Each tree was described in detail and the relative susceptibility of different species to wounding by different intensities of fire, the relative protection afforded the cambium by barks of different thickness and character, and the possible influence of such variables as aspect, slope, age, and rapidity of growth on resistance of trees to fire injury, will thus be ascertained. Particular attention was given to fungi found in the wounded areas. Many specimens were collected and cultured. The presence of insects was likewise noted.

This study is preliminary to further investigations which will contribute to the better appraisal of fire damage to the Appalachian hardwoods. Correlative studies on woodrotting fungi which gain entrance through fire scars will be carried on by Nelson.

Loblolly Pine Study

MacKinney spent a portion of the month completing the analysis of the data obtained from the six loblolly pine sample plots near Witherbee, S. C. Since their establishment in 1905 these plots have suffered severe losses due to attacks of the southern pine beetle which have practically ruined them for the purpose for which they were established. However, they afford some valuable information on the

growth of individual trees, which is being prepared for inclusion in a short article for the Journal of Forestry.

The computations on increased growth following cutting in loblolly pine have been continued through the month by Miss Stoughton and Cochran. The multiple correlation phase of this work will soon be completed.

Methods of Cutting; Hardwoods

During the month work was concentrated in four study units in the white oak - red oak type on the Bent Creek experimental forest. Three of the four units were marked for different methods of cutting. The first unit of six acres is to be clear cut, all brush and tree reproduction first being cut. Another unit of eleven acres was marked for a selective cutting in which all trees of undesirable species, form, or condition will be removed. On a third area of nine acres all merchantable trees were marked for cutting. This type of cutting will most closely simulate commercial practice. The fourth unit will remain untouched and will be used for a check area.

General data on all these areas have been obtained and more detailed observations will be made on half-acre permanent sample plots.

Forest Entomology

Caird with two assistants continued southern pine beetle work at Bent Creek. R. A. St. George returned to Asheville after a western trip, where tree medication studies are being carried on in connection with work on attacks of the mountain pine beetle in lodgepole pine. His visit there was to coordinate the work with that in progress on the southern pine beetle.

Mr. Ernest Bateman, of the Forest Products Laboratory, visited the Bent Creek laboratory conferring with St. George and Caird regarding certain chemicals which are being used in tree injection studies.

Forest Type Classification

The forest type classification for the eastern United States has been brought closer to realization by the visits of Professor R. C. Hawley, of the central committee of the Society of American Foresters. He is coordinating and extending the different forest type classifications that have been issued by several Sections of the Society. Professor Hawley's Asheville visit was in company with R. M. Evans. Lenthal Wyman and Dr. Pessin, of the Southern Station,

came to Asheville to discuss types of the coastal plain. Field trips and conferences were made. A tentative classification of forest cover types was assembled which included twenty moist site and sixteen dry site types in the mountain and plateau regions.

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CALIFORNIA FOREST EXPERIMENT STATION

The first week of August was spent in a hectic whirl of moving the Station headquarters and settling ourselves in the newly completed Giannini Hall at the University of California. Here we have 23 rooms, including 3 computing rooms, 3 laboratories, and stock and storage rooms, besides 6 office and laboratory rooms for the cooperating Office of Forest Entomology and 1 for the Biological Survey representative at the Station. The new quarters relieve the congestion of past months and provide comfortably for the staff and clerical force, including the addition of 5 staff members and 1 clerk soon to be made on account of the new work in fire and redwoods. So we are not worrying yet as to what we will do when the next expansion comes along.

Search for personnel for the new fire and redwoods jobs occupied a large share of attention from Kotok and Hill and proved to present unexpectedly knotty difficulties. Preparation for a summer meeting of the Advisory Council of the Station to be held on September 2 took considerable time and energy on the part of senior staff members.

In the visitors' roster for August Service and Department officers held first place. Dr. A. G. McCall, Chief of Soils Investigations in the Bureau of Chemistry and Soils, with H. H. Bennett and M H. Lapham of the same Bureau, and H. S. McCrory, Chief of the Division of Agricultural Engineering in the Bureau of Public Roads, visited the Station in connection with the mutual correlation of the research work of their respective bureaus and that of the Forest Service in erosion and water conservation. They inspected the Station experimental tank installation and were taken on a joint trip to see the appalling erosion from over-grazing in the foothills of the Southern San Joaquin Valley. On the 25th, Mr. Clapp arrived. Besides office discussions he accompanied Kotok to the new fire research center on the Shasta Forest and to the run-off and erosion plot installations on the Sierra Forest. Other visitors included Acting Dean Nelson Brown of the New York State College of Forestry, Professor H. W. Edwards of the Department of Physics, University of California at Los Angeles; Forrest Shreve, Director of the Carnegie Desert Laboratory, Tucson; and M. J. Fortie, one-time rubber planter in German East Africa, now of Hawaii.

Research Reserves

The important matter of selecting and designating research reserves, along with Centers of Work and Experimental forests in this Region has been unfortunately delayed by untoward circumstances of one kind or another. In accordance with the plans approved by the District Investigative Committee last January the Committee on Research Reserves, composed of Wieslander of the Station and Dunston of the Regional Office of Forest Management, made a trip from August 11 to 23 to the Lassen, Plumas, Modoc, Shasta and Trinity National Forests for the purpose of locating areas suitable for Research Reserves representing the more valuable commercial timber types. These types have been heavily alienated and what remains in Government ownership is rapidly being sold or obligated to operating companies. Prompt action is necessary if we wish to reserve areas of these types on the better sites. The following areas were inspected on the trip:

Plumas National Forest

Willow Creek Unit. An area of about 2000 acres representing sites II and III in sugar pine-Douglas fir-white fir and sugar pine-western yellow pine-Douglas fir-white fir types. Site II and sugar pine-Douglas fir-white fir type predominates, and the area is primarily selected as representative of these. It borders a county road within 10 miles of the Feather River Branch of the Station.

Lassen National Forest

Coppervale Unit. Approximately 1500 acres western yellow pine and western yellow pine-white fir types, Sites III and IV, typical of east side slope types, all aspects being represented. It is 20 miles from Susanville and adjoining the State Highway. The area is a distinct topographic unit in a region where all other timber of this character will be entirely cut out within the next 15 years.

Summit Lake-Hat Creek Rim Unit. Site IV western yellow pine type typical of the East side plateau. A county road traverses this area of about 1000 acres.

Swain Mountain Unit. This is a unit of 5000 acres representing Site II fir types. Pure white fir, red fir, and mixtures of these species occur. The area is on a gentle north slope and adjacent to the new railroad link connecting the Western Pacific and Great Northern Railroads. It is also readily accessible to the Trinity-Lassen branch of the Southern Pacific. This accessibility, the heavy stands, and the easy logging conditions make this a desirable area to reserve for an Experimental Forest when pulpwood species are in demand. The area is large enough to set aside a research reserve adjoining the proposed Experimental Forest.

Modoc National Forest

Lava Bed Unit. An area of 800 acres representing the level plateau Site III western yellow pine type of the east side. It is the sole area of this site in a township which otherwise consists of Site IV type. It is typical of an entire township to the east in private ownership and would have been alienated itself had the township been surveyed. A rare opportunity is presented to secure a natural area in a type which will be completely exploited in a few years, but there will be strong economic pressure to dispose of this unit, as close proximity to the Great Northern Railway extension will make the stumpage easily saleable at $5 or $6 per M.

Shasta and Trinity National Forests

No areas were visited on these Forests but the problem was discussed with the Supervisors and Technical Assistants who will recommend areas to be visited at a later time.

An effort was made to locate an area of Site II sugar pine-western yellow pine-white fir type which is typical of extensive holdings of the McCloud and Red River Lumber Companies on the Shasta, Western Modoc, and Lassen Forests, but none could be found. Probably the only opportunity to secure an area of this kind will be through land exchange or purchase and this cannot be deferred too long as these companies will have cut out all of this type in a very few years.

Forest Management (July and August)

The management field party, Hasel, Agri, and May moved from the Stanislaus Branch to the Feather River Branch July 1. At Feather River they charted for the 20th time 800 mil-acre natural reproduction quadrats and remeasured a 24-acre Mc plot ending the forests 5-year period. On the Lassen Forest they recharted 200 vegetative quadrats on the Fruit Grower's sale for the reproduction and slash disposal study. Two Mc plots of 35 acres were remeasured on the Shasta. Five plots are being worked in the Sequoia.

Dunning accompanied the field party to the Plumas and Lassen to help Hasel get started on the new work there and then continued on to the Modoc to go over a proposed growth study which Bacon of the Modoc is making in a 5-year check on the Warner Mountain Management plan.

From the Modoc Dunning returned to the Stanislaus Branch to continue charting the 790 natural reproduction quadrats there. The many changes resulting from logging, slash disposal, last year's drought and a favorable spring have made this a considerable task. In the past it has been necessary to delegate some of this work to temporary men. In many cases careless work has added to the difficulties and detracted from the value of the data. It is deemed advisable that much of this charting be done by the man responsible

for interpreting the data, since there is much to be seen that cannot be recorded on maps or in notes. As time goes on it becomes more evident that subordinate vegetation is of primary importance. Any study which considers only trees can never result in conclusions of much value. Neither can the effects of grazing, erosion and ground water changes be ignored, - nor the influence of animals on seed supply and survival. Since one man cannot follow all these influences we have induced various specialists to study the same areas.

In the absence of knowledge we are prone to generalize about the harmful effects of grazing, fire, logging, etc. The small amount of data we have been able to collect in a careful manner brings out clearly that grazing, fire and logging must be regulated in accordance with local variations in the subordinate vegetation, the seed supply and climatic periods.

Around the Stanislaus Branch, for example, there are indications that a more elastic control of grazing would mutually benefit livestock and reproduction. Following cutting, under the conditions of vegetation and climate, there has been a marked increase in forage over that existent in the virgin forest. There has been little tree seed and a succession of years unfavorable to the establishment of reproduction. Fenced areas have become so overgrown with lower vegetation that it seems doubtful if restocking with desirable tree species will be possible with return of normal seasons and seed crops. Heavy grazing by cattle after cutting until a good seed crop occurs would, under these conditions, be beneficial provided the general range plan permitted removal of the stock to other areas for perhaps 4 or 5 years.

The variable effects of logging on ground water can be demonstrated around the same station. On three of our sample plots there are shallow draws which were not known to carry surface water prior to cutting. Following cutting these draws carried running water until August 1 or later during an exceptionally dry year. Some may guess that the heavy cutting has reduced transpiration losses. One steeped in forest and water propaganda will be irked into making a counter guess. Being one of the latter, I guess the water appeared in the surface, because of the pernicious practice of making main skid trails out of the draws. The trails were cut down to the subsoil intercepting ground water which formerly came to the surface in springs farther down the slopes. In another place a railroad cut opened a fine spring on a formerly dry slope. The water is to be piped to the station. Opposed to these results is the drying-up, after logging, of two small streams which formerly ran year-long. The channels were blocked with debris and the water diverted by log trails to such an extent that it all sinks into the ground near its origin from springs.

The repeated charting of many areas in minute detail also brings doubts as to the time honored idea of the soil stirring value of logging in relation to reproduction. There is doubtless adequate stirring with 25 to 85 per cent of the surface affected in many cases. But perhaps the soil stirring idea came from countries where soil stirring is needed, with an "A" horizon, "roh humus", and wet summers. What of removal of our thin layer of good top soil by water and what of succession?

The Stanislaus center has been favored with many visitors this season. Mr. Watts came from the Great Basin Station to see if we have any research tricks worth adding to his kit. Mr. Averil from the Southern Station, on leave, to talk shop, Mr. Gudden, of the Bavarian Forest Service, looking for a good fir to introduce into Germany, and many others.

Cover Types

The two crews working in the Santa Barbara National Forest and vicinity completed the customary monthly quota of about 10 townships each. A third crew was put into the field August 15, consisting of Mr. Clar and a new field assistant, John Spring. They began mapping along the northeast boundary of the Santa Barbara Unit and will cover the Tehachapi Mountains and areas adjoining the Sequoia National Forest.

Of particular interest was the reporting by the type crew on the Santa Barbara of two relict areas of pure sugar pine stands. This unusual type was first encountered in the type work in Del Norte County by Wieslander in 1927. Later that season the type crews discovered an area in Mendocino County and another in Sonoma County. The next relicts in this type to be mapped were in the Santa Lucia Mountains in Monterey County and now the two previously mentioned areas on the Santa Barbara.

These few relicts far flung from Southern California to the Oregon line suggest the probability that large areas of this type formerly occupied a definite climatic zone along the Coast Ranges. To what their near extinction can be attributed is an interesting problem. That fires and resulting erosion have played no small part in recent years in reducing the size of the few remaining areas is evident. On Santa Lucia Peak in Monterey County the type coincides with a soil relict of a fine sandy loam underlain by coarse granitic sands and gravels. On surrounding areas erosion has exposed the coarse and sterile subsoils and the type occupying them is a chaparral of three dominant species primarily. Two of these, Quercus chrysolepis and Ceanothus integerrimus, were constituents of the original sugar pine type. The third, Arctostophylos glandulosa, is an invader and an indicator of the site deterioration that has taken place. Other

indicators of this deterioration are the reduction of Quercus chrysolepis to a scrub form and the stunted character of sugar pines that have seeded in and vainly attempted to conquer the chaparral.

Forest Influences

Of outstanding interest in connection with the influences work was the visit to the Station of Dr. McCall and H. H. Bennett and M. H. Lapham in the course of a general survey of erosion throughout the country. After inspecting erosion in the bean lands and other agricultural areas under direction of a soils expert from the University, the party was joined by Kraebel and Lowdermilk for a tour of grazing lands in the vicinity of Bakersfield. In this region of scant rainfall (10 inches or less annually) the foothill lands of both the public domain and private ownership have been severely overgrazed for many years. The gradual destruction of the original vegetative cover and the continued mechanical disturbance at critical times by stock have resulted in the complete loss of the original top soil over extensive areas. Gullying is in active progress through the region and in many places has reached spectacular proportions quite beyond the possibility of economic control. Dr. McCall expressed the opinion that, as in many other products, so in erosion also California seems to have produced the superlative.

Upon their return to Berkeley the party examined Lowdermilk's tank experiments and the data from the field plots which they were unable to visit, and then assembled in the Director's office for a conference on the general problems of forest soils and erosion.

The visit of Dr. Forrest Shreve gave both Kraebel and Lowdermilk an opportunity to discuss their respective problems with this eminent student of the semi-arid southwest.

Devil Canyon Branch. Weaver reports complications in his efforts to check damping off in the Coulter pine seedbeds. The attempt to reduce spread of the disease by reducing the water supply resulted in additional losses, apparently from drought.

Continued improvement of the physical plant, such as clearing firebreaks, screening soil and excavating for a new utility building, occupied the nursery force during the month.

Products

Lumber Depreciation. Tabulating machine summaries for the degrade and remanufacturing study have been arriving from Madison in such quantity that final computing and preparation of tables has fallen considerably behind in the rate of progress which would be

possible if the Products computing force were not so limited. Practically all of the month was spent by Brundage and Mason in analyzing white fir depreciation and developing a suitable form for presentation of results in articles to be published in the lumber trade journals. Straight tabulation of data necessary to show original degrade and remanufactured grades by thicknesses and widths requires so many headings and so much space that the figures would be difficult to follow and would thereby fail to bring out with sufficient emphasis the striking differences between size and grade segregations. A form of bar diagram has finally been developed which shows the changes in grades and widths from green to remanufactured dry lumber all in one line across the page with figures at the end showing the value changes.

Probably the most important fact brought out in the white fir study is the large percentage of C & Btr. which could be obtained from the common grades as now produced. In 1" x 8" and 10" No. 1 Common, for example, it was found that 22% of C & Btr. would result from careful remanufacture for the removal of wany edges, knots at the ends of otherwise clear pieces, etc. The loss of original No. 1 common to obtain this increased value was only 3.5%.

California Economic Research Council

Hill's Natural Resources Committee is working, by request from many sources, to secure Research Council aid in securing approval by the State Department of Finance of an increased budget item of $110,000 for the next biennium for state cooperation with the U. S. Geological Survey in speeding up the completion of the topographic survey for this state; also to lend its aid in securing sufficient added resources for the Geological Survey to permit bringing up to date the publication of the topographic sheets as well as water resources bulletins, for which the field work is already done and in which publication is nearly four years behind. These maps and publications are constantly used and needed for engineering work in practically every kind of resource development and the lack of such base maps is one of the main hindrances to completion of the Station cover type map.

Consulting Entomologist

The principal job during the past month at the Hackamore camp has been the completing of the field work on the trees being studied in the biological control experiment and the collecting and sorting of the material that is emerging from caged samples from these trees. The final bark sample has been taken from each of the 13 trees being followed and complete records taken on the slope, degree of shade, bark thickness, stage of brood and other conditions that would affect the mortality of the broods from high temperatures. Sample bark

counts of the broods were also made from each tree before and after being exposed.

The first part of the month was spent on the summer control of infestation found on the Devil's Garden area where an attempt at extermination is being made. The amount of western pine beetle infestation on the area is very much reduced but a number of dying trees were found, most of which had only small bark areas infested with the western pine beetle. A further reduction of infestation will probably be very difficult.

Jeffrey completed his sugar determination studies at Buck Creek and returned to Berkeley on the 18th. He intends to complete the work on his master's degree this semester. Durbrow closed up the Buck Creek camp and moved his equipment to Hackamore where he is continuing his studies on the relation of pH of the inner bark of western yellow pine to the attractiveness of different trees to the western pine beetle.

About half of the 10 check areas, which are being examined yearly to follow the infestation cycle in this region, were also cruised during the latter part of August and all infested trees found marked and recorded. Most of the plots show the return to very low epidemic or endemic conditions with practically no grouping of the infestation, though the loss on the poor border sites of the Glass Mountain unit is still quite high. It is noteworthy that on such areas many of the trees are apparently killed by mixed broods of Ips emarginatus, Dendroctonus monticolae, and Melanophila spp. with only small patches of D. brevicomis or rather of D. brevicomis alone as is usually the case.

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CENTRAL STATES FOREST EXPERIMENT STATION

General

G. F. Gravatt, pathologist of the Bureau of Plant Industry visited the Station in making a survey of the occurrence of Dutch Elm disease in the region. Five cases of infection with this disease have been found in Ohio in Cincinnati and Cleveland. The present status of the chestnut blight disease in central Ohio indicates very nearly one hundred per cent infection on some chestnut slopes. The hillsides were this year thickly spotted with brown tops of dying chestnut trees.

Drouth in the Mid-West

Kellogg reports the effect of several seasons of drouth is becoming very apparent in some plantings of northwestern Iowa. For

several years, a subnormal rainfall has been received. This is resulting in the loss of many trees planted individually, in rows, and in belts. Out of eight or ten walnut plantations visited in this region, all, except two which are in an advantageous position, are showing the severe effects of drouth. The simultaneous occurrence of bad infestation by the black walnut catapillar is accentuating the damage. Trees singly and in groups have died for no apparent reason other than lack of adequate moisture and excessive defoliation.

Other species are also badly hit by the drouth of this year. In Sac City, Iowa elms were observed on August 3rd to have dropped half of their leaves and a butternut planting was found to be rapidly dropping its leaflets on August 9th.

In Cass County, Illinois between Beardstown and Bluff Springs, black jack oaks were observed with foliage browned and shrivelled from excessive temperatures and drouth which came prior to August 16th. The damage appeared quite like fire injury, except that the tops of these trees were browned above and green beneath, whereas in fire damage the reverse is usually the case. There appeared to be a considerable variation in susceptability of individual oaks. Some were very slightly damaged and their neighbors standing alongside were badly injured. In the same region black locust, hickories and black maple were observed to be unaffected by the heat. A farmer stated that the temperature reached 108° F. He also stated that hickories in places had shrivelled leaves like the black jack oaks. In Champaign County, Illinois, this injury to hickories was found. Black oaks also carried some injured leaves. White oak in this vicinity appeared to be injured but little.

Plantation Study (Fp-1)

During the month the examination of black walnut plantings in Iowa was completed. Lucas and Sowash finished examining and measuring stands in the Missouri river bottoms and northwestern portion of the state. Upon the completion of the north central district, Dodge and Thielking visited several stands near Clinton, enroute to Illinois.

Very few references to walnut plantings in Missouri are available. Kellogg, Lucas and Sowash visited those which are known but found that in a land rich in old and young growth of the species, plantations are few. Contact was made with State Forester Dunlap by Kellogg in an endeavor to locate more groves. At the conclusion of inspections in Missouri, Lucas and Sowash left for the Clark County State Forest at Henryville, Indiana to carry on MC-1 work at that place.

Kellogg made contacts with the Frank Purcell Walnut Lumber Company and the Shanklin Walnut Company at Kansas City, Kansas and with Pierson-Hollowell Lumber Company and A. T. Foley Lumber Company

at Danville and Paris, Illinois, respectively, in an endeavor to further determine the amounts of plantation walnut being cut for the trade.

During the month the following plot work has been done.

Species	Plots	Notes Only
Cherry, black	1	-
Hickory, shagbark	1	-
Poplar, yellow	1	-
Walnut, black	48	17
Total	51	17

Gas Pressure in Black Walnut

In taking increment cores in plantation walnut, Dodge and Thielking noticed that a slight popping sound was heard at one stage of the boring. Checking the position of the bit and length of core proved that these sounds came just as the bit hit the region of the pith. Cessation of boring did not stop the popping. The sound is similar to the slow bubbling of air through water with a fine straw. This performance can be repeated on many trees and indicates that the center of the tree has been reached. The placing of a film of saliva over the rear opening in the bit, indicated a gaseous pressure as the film bulged out and broke.

Woodland Grazing Study (Pa-1)

The field work on the woodland grazing project has centered around the problem of finding areas needed to round out the data collected during the general survey of the last two years. Woods of the beech-maple type in northern Indiana and Ohio received particular attention.

Twenty five plots, equally divided between Indiana and Ohio, were measured during the month. Smith and Keefus returned to Lafayette, Indiana at the end of the month to continue their studies in the forest school at Purdue. Their place will be taken by the transfer of Lucas and Sowash from the plantation project.

Farmers through northern Ohio report that the present drought has so depleted the pastures that livestock are being turned into the woodlots in much greater numbers than normally. This has been repeatedly verified by the crews. Many areas previously ungrazed or only lightly grazed are at present stocked to the limit. The average intensity of stocking in the Corn Belt as determined last season, was about one cow unit for every 1.8 acres of woodland. A

check during the last week of August showed that many areas were being grazed to the extent of 1.4 acres per cow unit. General observations indicate that woodland pasture has suffered less from the drought than open pasture. The effect on the woodlot has been quite pronounced, however, for an usually large amount of mortality has been observed in this years reproduction, particularly the young white ash. The livestock also have been forced to brouse species which normally are not seriously damaged. Shagbark hickory, black walnut, black cherry, dogwood and even red gum, ironwood and blue beech, have been broused by cattle on areas where the vegetation was particularly short.

Kellogg has made an interesting observation on the palatability of walnut sprouts in a heavily thinned plantation in Illinois. Walnut sprouts have usually been found to be more palatable to cattle than seedlings are, however, he found that horses did not touch either walnut or catalpa sprouts even though the blue grass had been grazed down short.

Field work on the project for this year will be largely cleaned up by the end of September with the exception of a study of the apparent specific gravity of the soil in grazed woodlands as compared with ungrazed areas. It is hoped that this study will give some data on the degree of packing of the soil by cattle and its effect on the aeration and the moisture holding capacity of the upper strata of the soil. This phase of the study will be carried on with the equipment which Dr. Auten has been using in his work this summer.

Measurements

With a view to gathering volume table data for future plantation work, Barrett spent the first week in August at the Ohio Agricultural Experiment Station getting stem measurements on trees cut in thinning operations at the arboretum. Ray F. Bower, Assistant State Forester of Ohio who was directing the thinning, worked with Barrett in getting the data. Duplicate copies of all measurements were made, one copy being retained for the State Forester's files. Both D.I.B. and D.O.B. measurements were made at 1, 2.5, and 4.5 feet above the ground and at ten per cent intervals of the stem height above breast height. Measurements were obtained on the following number of trees

Red Pine		Scotch Pine	
D.B.H. Class	No. Trees	D.B.H. Class	No. Trees
1	18	2	3
2	70	3	10
3	66	4	6
4	11	5	4
5	8	6	0
6	7	7	1
	180		24

Norway Spruce		Corsican Pine	
D.B.H. Class	No. Trees	D.B.H. Class	No. Trees
2	1	2	2
3	6	3	3
4	6		5
5	6		
6	1		
	20		

Most of the trees measured were in the 20 year age class. Trees were measured from plantations of various spacings from which it may be possible to study the effect of spacing on form development.

Litter Study (M-1)

Auten, with a field party of three men, carried his investigations of the effect of litter on the various properties of the soil into Indiana and Illinois.

Oak Yield Study (TS-12)

Two men stopped at Henryville on their return from Illinois and remeasured the sample plots in chestnut oak to determine the effect of various types of cutting on survival of seedlings. On their return to Columbus the third measurement was made on experimental plot at Hay Hollow east of Chillicothe, Ohio. This plot which had been clear cut and burned previous to planting with yellow poplar is now at the end of its third year of growth since the burning. A sprout stand of hardwoods, principally locust, oaks, hickories, white ash and red elm have now established a cover approximately twelve feet high. The yellow poplar planting is practically a failure since the seedlings cannot compete with the dense, rapid growth of sprout hardwoods.

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NORTHEASTERN FOREST EXPERIMENT STATION

At the request of the Washington Office Behre made a trip to Pittsfield to confer with officials of the Lightning Protection Division of the General Electric Company on the possibility of using Thyrite for protecting telephone equipment against lightning storms. Thyrite is a material which has the property of increasing its capacity tenfold each time the voltage is doubled. Officials of the

General Electric Company believe that the "acoustic shock" reducers which are now used to protect operators from "acoustic shock" resulting from lightning surges on the line will be replaced entirely by Thyrite in the near future. Field tests made with Thyrite disks inserted between the line and ground on commercial grounded and metallic telephone lines have indicated that there is no difference in the transmission of either magneto signals or conversation when this material is used in place of the lightning protector used at the present time. Ranger Hale of the White Mountain National Forest will make further tests with Thyrite on standard Forest Service telephone lines. Should Thyrite prove effective in protecting instruments against lightning it will serve also to reduce materially the noise on the telephone line caused by lightning storms since the material acts also as an "acoustic shock" reducer.

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Spaulding and MacAloney have been investigating the decadence of birch on cut-over areas in northern New England. The hire of one temporary field assistant in this work has been made possible by funds contributed by the Vermont Forest Service and the Brown Company of Berlin, New Hampshire. In the White Mountain National Forest over 300 trees were felled and carefully examined for Armillaria mellea. MacAloney made examination for bronze birch borers. It was found that borers and rootrot were the primary cause of the death of but a small percentage of the trees. Initial injury from other factors appears to weaken the trees and lead to attack by borers and fungi. The latter appear to be entirely saprophytic. A number of trees were chosen and their entire root system dug and washed out. The roots were then drawn to scale with a plane table. No essential differences could be seen in the health of the roots of variously diseased trees. Later about 200 trees were examined in New Hampshire and Vermont for indications of possible vascular disease, but with no indication of that sort of disease being noted.

In cooperation with Finch, Pruyn and Company of Glens Falls, New York, and the Department of Forestry of Cornell University, Westveld established five methods of cutting and reproduction plots in the spruce flat and spruce and hardwoods types in the Adirondack Mountains. In laying out these plots Finch, Pruyn and Company did all the necessary surveying and subdividing of the area as well as making a type and topographic map from which a relief model will be made at some later date. Students of the Cornell Forestry Camp helped in making the reproduction and sapling tallies. Detailed soil tests on these plots will be made by the Department of Forestry at Cornell University.

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The checking, installation and trial operation of new duff and air thermographs and new hair hygrographs on the clear cut half-cut and full timbered inflammability stations at the Priest River Branch required considerable of Gisborne's time. From the start, however, these instruments gave very interesting information on the factors which result in decidedly different degrees of fire danger under different densities of timber canopy. Although we already have two seasons' records of surface duff maximum temperatures, the new continuous records show many features previously unsuspected. For example: The shade of a small fence post on the clear cut area reduced the temperature of the surface three-fourths inch of duff from 142° F. down to 117° , while the shadow was passing over the duff bulb. Under half timber canopy the removal of one small branch from a green hemlock tree increased the maximum duff temperature by more than 10°. Light clouds and haze or smoke in the air were also found to reduce duff temperature far more than they reduced the air temperature. As the heat of vaporization diminishes with increased temperature it is obvious that any condition which causes rising temperatures in the fuels accelerates the drying process at a rate even greater than that of the temperature rise, whereas any shade that reduces the temperature of the water in the fuels decreases the evaporation of this moisture far more than indicated by air temperatures, and hence reduces the degree of inflammability. With the accumulation of a few years' records of these conditions it should be possible to work out more precisely the value of different amounts of forest canopy in preventing high and extreme inflammability.

These measurements are also believed to be of value in determining the effect of shade on the survival of various species of tree seedlings under different amount of forest canopy. The initial measurements already indicate the extreme difficulty of survival on clear cut areas when surface temperatures rise to over 120° F. for as many as eight hours in one day. Haig has made a complete set of measurements of light intensity at each of the three inflammability stations and additional work is planned in order to make all of this work serve the purposes of both silviculture and protection. One question, which at present is bothering us, is the decision as to whether a half cut area consists of one on which half the basal area has been removed, half the vertical crown density removed, or enough cut so that the ground thereafter receives half the light of a clear cut area. Suggestions from men who have worked on such problems would be appreciated.

During August Mr. F. C. Crombie, recently assigned to the Spokane office of the Weather Bureau on fire weather work, visited the Priest River Station for the first time and inspected all of our weather measuring equipment both at the Station proper and at the Experiment Station Lookout. While at the lookout Crombie had an

opportunity to witness the development of local thunderstorms of a peculiar type. This particular storm consisted of one cloud about 16 miles wide by 45 miles long, with three small thunderstorm areas moving around within it. One of these three had little lightning and plenty of rain, one was an average lightning storm, while one was largely cloud to cloud lightning with only a sprinkle of rain. Over an inch of rain the following night extinguished nearly all the fires started by these storms. It is the concensus of opinion in this region that the electrical storms this year have not been nearly as dangerous as those experienced last year.

Haig and two field assistants continued on quadrat and cone crop examinations of the reproduction and methods of cutting studies through the first three weeks of August, following which they journeyed to the St. Joe and Clearwater Forests to remeasure a series of semi-permanent yield plots now five years old. These plots were selected for the purpose among a large number of temporary plots taken in our normal yield study of western white pine in 1925. Only the boundaries of these plots were blazed and one corner post set and tied-in to some convenient landmark. Trees were not tagged and gross values per acre only can be obtained at each remeasurement. As the plots were inexpensive to install and will be easy to remeasure, it is believed that they will prove of value in supplementing our skeleton series of regular permanent yield plots on which the trees are tagged and measurements are taken in more detail.

Conditions on the four-year-old permanent methods of cutting and reproduction plots (which are the older of our expanded set of installations in these projects) are now beginning to stabilize and the indications are that within a few years these plots will contribute very measurably to our knowledge of the silvical facts pertinent to white pine reproduction. Cone production studies, for example, already indicate that among seed trees 160 years and older the great bulk of the cone crop is borne on trees 16" D.B.H., over 75% of the fair and good crops occurring on trees of this size, though trees as small as 7 inches D.B.H. are reported with poor crops, and trees 12 inches and up occasionally bear fair and sometimes good crops. At the same time good seed bearers occur among younger trees, 100 to 120 years old, in materially smaller size classes, the records indicating that here 75% of the good and fair crops are borne on trees 12" D.B.H. and up, whereas the smaller trees bear fair crops with reasonable consistency. The relation between seed crop and seedling germination is of course a very marked one. In the present season a fall of 24,000 white pine seeds on one area in the fall and winter of 1929-30 was followed by the germination of 5000 white pine seedlings per acre, while on another area where conditions for germination were just as favorable a fall of 4000 white pine seeds per acre was followed by a crop of 825 white pine seedlings--the approximate 5 to 1 ration in these instances being particularly striking.

Weidman and Haig spent four days early in August on the Coeur d'Alene Forest engaged mostly in reconnoitering sites for an experimental forest in this locality. Three drainages were examined on this trip. Altogether this makes the fourth area visited for this purpose in the Coeur d'Alene region. It seems to be especially difficult in the northern Rocky Mountains to find areas which meet reasonably well all the requirements of diversity of age classes, representative type conditions, adequate size, and accessibility for making small timber sales. After searching several years for a Coeur d'Alene area, one which partially meets the needs, has at last been decided upon for recommendation by the Experiment Station and the Office of Management. The need of a central experimental area on this Forest is becoming particularly urgent for the reason that we are increasingly working in this locality. Already there are twenty-five permanent sample plots in yield and methods of cutting on the Forest. Sixteen of these plots are located within or in the immediate vicinity of the area that has just been selected. Mr. Clapp was taken to see this area during his brief 2½-day visit to the Northern Rocky Mountain region this month.

Another region in which it is desired to locate an experimental forest and which is likewise offering obstacles is the southern portion of the white pine type on the Clearwater Forest. A trip there last year failed to discover suitable conditions on two areas that had been proposed, though it resulted in finding a very satisfactory natural area. A second trip to the Clearwater territory is to be made to examine two additional areas which diligent inquiry and poring over type and age class maps have uncovered as possibilities.

An interesting example of a second cut from early yellow pine selective logging was visited during the month by Weidman in company with Anderson of the Products Office. This re-logging job was being done by the Lumber Department of the Anaconda Copper Mining Company. The trees which were being cut had made between four and seven inches of diameter growth at breast height in the 35 years since the first cutting, or an average of about 1½ inches per decade. It was stated by the logging superintendent that the cut on the re-logged areas averaged about 4000 board feet per acre. The logging of residual timber in this way was being done adjacent to the main railroad lines where they passed through old cuttings on the way to two or three camps operating in virgin timber. The farthest skidding distance was reported as one half mile, which was probably an extreme case. It might be mentioned that the cut in virgin timber in this locality runs around 15,000 board feet an acre. The operation furnishes an actual example of second cutting such as foresters frequently talk about as a desideratum for private forestry. The original cutting, of course, was unintentional selective logging or high grading, and the present return cutting is being done because it pays, which should be the basis of any private forestry measures.

The sapling growth left after removing the standards on these old cuttings is very thrifty and covers the ground sufficiently to make a fairly good stand of timber at rotation age. It will naturally be an even-aged second crop.

Thompson reports results of the drought at the Branch Station in the form of a loss of over 50 per cent of white pine planting stock set out last spring and of the entire reduced flow of Benton Creek going into the Station water mains. This means that the creek below the dam is dry--an unprecendented occurrence in the 20 years history of the Priest River Station. Thompson also mentions two fires as having been started on the experimental forest by a particularly bad lightning storm which passed over this section of the Kaniksu Forest. These were put out before reaching even small Class A size. Weather conditions have been quite freakish at the Station with 1¾ inches of rain mostly in the latter part of August (nothing like this elsewhere in Region 1) and dry conditions prevailing again at the time of preparing this report.

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PACIFIC NORTHWEST FOREST EXPERIMENT STATION

General

Mr. Clapp was with us ten days, August 11 to 20, most of which time was devoted to discussions of the technic of the Forest Survey project and to personnel and appropriation matters. He spent two days in the field, one at Wind River and the other with a group of the Forest Survey staff, Granger, and Munger, viewing routine field work on logged-off land in Columbia County

The Forester had a few days in this territory with Congressman Simmons of Nebraska, and Munger spent a day with them and others in a tour of logging operations and private lands offering acute protection and land-use problems in the lower Columbia region. He was also at Wind River during their few hours there. The Director attended the sessions and dinner of the National Lumber Manufacturers' Association meeting held jointly with the West Coast Lumbermen's Association, and also the dinner meeting with Governor Norblad of twenty five representative sportsmen and timbermen, who met to discuss the pros and cons of closing the hunting season during periods of fire hazard, a very controversial point at present in Oregon where the normal hunting season opens September 15, when the forests are often in their most inflammable condition.

Out-of-town callers at the office during the month included

Colonel Greeley of Seattle, Dr. J. S. Boyce of New Haven, Dr. Karl M. Müller of Munich, Dr. Scheffer of the Biological Survey, Mr. Jay Stevens, State Fire Marshal of California, Mr. Wentworth, President of the National Fire Protective Association of Boston, Mr. Gisborne of Missoula, Dean Miller of the Idaho School Forestry, and Messrs. Gudden and Ebner of Munich.

One of our esteemed contemporaries in the East reports on page 1 of the June Monthly Report "a discovery" that those who carry liability insurance on their personal cars can get protection while they are driving government cars by paying 25 per cent extra. Several of us at this Station have been getting this service for years, only at a lower charge. Some companies charge 10 per cent extra for the government car clause; others a flat charge of $5.00.

George W. Alexander

Forest research in the Pacific Northwest has suffered a very real loss in the death of George W. Alexander of the Weather Bureau. Mr. Alexander had for four years been assigned to fire weather duty at the Seattle office of the Weather Bureau and had been intimately associated in that way with the foresters and the forest protective agencies in Washington. He was a pioneer in the study of fire weather meteorology and made notable contributions to that science. Research and administrative foresters alike regarded him as a valuable ally and will miss him as a friend and coworker.

Fire Studies

Most of McArdle's time during the month was spent on the Douglas fir slash disposal study. Five new plots were established in fresh slash, two old plots were remeasured, and several of the older plots were reexamined. Trips with local fire wardens were made to a number of the older slash areas to build up "case histories" for typical areas. Difficulty is experienced in locating places where the slash is more than ten years old and is still unburned. An attempt is being made to correlate the amount of barkless surface of logs with the amount of wood removed by a slash fire; measurements are also made of the amount of barkless surface due to various causes such as logging, snag logs, sloughed off following logging or fire, the amount of bark burned off, etc. The amount of barkless surface exposed to fire is important since the fire behavior studies show that this is the surface which catches and holds the fire, rather than the bark itself when on the log. A ratio between volume and surface area of logs is being computed for a large number of slash areas. Several hundred moisture content samples were obtained for comparison of the moisture content of fuels under different types of cover as against open areas with no brush or forest cover. A large

amount of necessary computational work has been done during the month and this work is practically up to date. Along with other work a large number of measurements were made in a minor study to determine the response of fuel moisture to changes in atmospheric humidity under different types of cover, to learn what effect a rain has in increasing the moisture content of these fuels, and how soon the effect of the rain is lost.

Several dozen sticks of Douglas fir sapwood were prepared for use next year in measuring the current state of fire danger when measured in terms of fuel moisture content.

In preparation for the statistical analyses of fire records which will be started this fall, some time has been spent in reading various reports and bulletins and a beginning made in drafting a work plan for this project.

Natural Reprotuction Studies

Cone crop reports from the national forests have been compiled and the information digested and sent to interested parties and to the press. For most species the cone crop is good, and for Douglas fir the best since 1923. This will give an excellent opportunity to check the amount of reproduction that will spring from the seed fall on freshly logged and burned areas in the vicinity of green timber and hence additional groups of semipermanent reproduction plots have been put in near the Wind River Branch Station and at Wilark, Oregon. Another series will be put in at Westfir, Oregon later in the season.

On both the Wind River and Wilark areas seed traps were set in conjunction with the sample plots. They will give a potential measure of the seed fall per acre from which the reproduction springs.

During the month Isaac accompanied a "show me" party, consisting of Assistant Forester Fred Morrell and several Regional, State, and Association forest officials, over the much discussed Grays Harbor County. This county is nearly cut over and now has vast areas of highly productive forest land that is not reforesting satisfactorily because of the rapid rate at which it is being shorn of standing timber and the repeated fires that follow. The realization that something must be done with such areas can not come too soon.

Western Yellow Pine Growth Study

Meyer was on the sick list most of the month as a result of an infected blister. He was back on duty in the office the last days of the month, and then on September 6 was married to Miss Constance Button. Kolbe concluded his work on yellow pine growth in Oregon and moved to eastern Washington, when Meyer became disabled, to handle the work there during the remainder of the field season.

Wind River

A considerable part of Simson's time during the month has been devoted to cooperation with Beatty in the tests of short-wave radio for Forest Service communication. Notably he spent a week at Spirit Lake at the north end of the Columbia Forest making measurements of the signal strength of the central and portable stations on the Columbia, static measurements, and transmission tests.

The high frequency of lightning storms has also caused Simson to spend much time making static measurements and taking static bearings.

Among the interested visitors at Wind River this month was Fire Chief Grenfell of the Portland Fire Department, who accompanied McArdle there. He was much impressed with Forest Service preparedness for fire control and with many details of the technical equipment. He stated that the problem of the City fire department is not lack of equipment, but lack of knowledge on the part of the firemen as to what to do at the right time under all the varied conditions encountered. To overcome this deficiency he is conducting a fire college this winter for groups of twenty-five firemen, which will give them the technical and theoretical knowledge to know how better to combat fires of various types.

Forest Survey

The collection of private cruise records in the vicinity of Portland has been practically completed. Moravets and Bolles spent the month of August transcribing records of timberland owners in Seattle, Tacoma, and neighboring towns. Permission to use the Weyerhaeuser Timber Company records has been secured and Moravets and Bolles will commence work in their office early in September. This involves approximately 1,000,000 acres of timberland and will require the entire attention of these two men for about one month.

All existing records having been compiled, field work was started in Tillamook, Clatsop and Washington counties. These counties will be completed in middle of September. Columbia County has been completed.

The reproduction surveys of cut-over land in the offices of the Western Forestry and Conservation Association, aggregating two or three hundred thousand acres, have been copied.

Girard spent considerable time with Matthews coaching and checking the men assigned to the Survey on the Umpqua and Olympic National Forests. Girard has also drawn up tentative plans and procedure in checking and adjusting both county and private cruises.

Arrangements have been completed for the use of the Regional office fire patrol airplane for taking aerial photographs of a portion of the Siuslaw National Forest as soon as the atmosphere clears.

Forest Insurance

Mr. Shepard was in the office most of the month preparing plans for his field study of damage, and left at the end of the month to commence the cruising of fire damage on fires of 1928 and 1929 in certain typical counties, the purpose being to relate the damage conditions as he finds them to the wardens' reports of the same fires as a basis for later making a statistical study of all fire reports of recent years.

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SOUTHERN FOREST EXPERIMENT STATION

General

Demmon returned to New Orleans at the end of August after an absence from the office of five weeks, during which time he covered over 4,000 miles in the Southeastern States by automobile. The trip enabled him to get in touch with a number of organizations and individuals who are directly or indirectly concerned with the work of this Station. Among the places visited were Montgomery, Alabama; the Camp Pinchot and Starke Branches and the Osceola Forest in Florida; Savannah and Atlanta, Georgia; Charleston, South Carolina; Raleigh and Asheville, North Carolina; Hopewell and Charlottesville, Virginia; and Washington, D. C. Nine days in Washington and five days at the Appalachian Station gave Demmon an opportunity to discuss Station plans in Washington and to exchange ideas with the research staff at Asheville.

Two members of the staff were away from their respective headquarters on detail. Averell spent three weeks in Washington, assisting on the Forest Bibliography, while Pessin was on detail at Starke, Florida.

Wyman figured in a serious automobile accident, but escaped with minor injuries. A car driven by a young boy crashed into the car in which Wyman and Mrs. Wyman were riding, resulting in the death of two of the occupants in the other car.

At the Starke Branch George P. Shingler of the Bureau of Chemistry and Soils, and Mr. L. C. Hall, Chemist of the Hercules Powder Company of Hattiesburg, Mississippi, spent several days going over the work under way.

Mensuration

Cruikshank spent three days at Morgan City, Louisiana with the Region 7 valuation crew under Lehrbas, assisting in the construction of a local Volume Table for Tupelo.

Forestation

Wakeley, assisted by Cruikshank, worked on seed and germination records of longleaf pine during most of the month, and covered all the seed work since the establishment of the Station. Wakeley spent three days in southwest Mississippi and southeast Louisiana in search of pine cones, particularly slash pine.

The cone count was completed at the Union tract near Starke. The crop of longleaf pine cones is very small there and squirrels seem to be very active this year. In some cases they have taken from one-third to two-thirds of all the cones from the trees, not only on longleaf trees, but also on slash where a great number of cones have been observed cut off by the squirrels.

Naval Stores

In cooperation with the Bureau of Chemistry and Soils and the University of Florida, six trees each of longleaf and slash were selected and chipping started on them at Kingsley Lake. The gum is to be collected through glass funnels into glass jars and will be kept protected from free access of air. Chipping is to be done twice a week and the gum collected once every two weeks for analysis by Mr. S. Thronson of the University of Florida, under the direction of Professor Black.

Mid-season samples of dip were sent off to the Bureau of Chemistry and Soils at Washington for analysis. High yields have been the rule during August, which was hot and dry.

In the NS-3 work, correlations of relative humidity and yield have been started.

An extensive survey trip was made into southwestern Georgia and southeastern Alabama by Heyward, Harper, Rudolf, and Pessin. Some unburned land was found near Bainbridge, Georgia, where a tract called the "Guinea Farm" may be used later for permanent plots in the study of fire and naval stores. They also inspected lands of the Reynolds Lumber Company near Albany, Georgia, and the Wade Estate at Thomasville, Georgia, part of which had not been burned in 25 years. Information on fire damage was obtained at the Dukes Tract near Starke.

Types

Pessin and Wyman spent about a week on a trip to Asheville, North Carolina to confer with Professor R. C. Hawley of Yale and others on a type classification for the eastern United States. A number of points in question on the type classification came up for discussion during several conferences, and a list of Southern types which will be in accord with this classification, was prepared.

Financial Aspects of Forestry

The entire Financial Aspects staff, with two assistants from the Florida Forest Service (Manges and Harding) continued the economic studies in Bradford and Hamilton Counties, Florida. These cooperative studies are emphasizing the relation of the naval stores industry to forest production, and include a special inquiry into the question of taxation as it relates to the cost of growing pine in Florida. To better bring out the "pathological" taxation situation which is causing widespread land abandonment in Florida, studies in adjacent Georgia Counties are also to be made.

Erosion

Lentz, Sinclair, and Meginnis returned to New Orleans on July 30 after mapping portions of five farms in northern Mississippi. The first two weeks of August were spent working on the maps, calculating the areas that are actively eroding, the extent of cultivated, pasture, woodland, and abandoned land on the portions of the farms mapped. The relation of soil erosion to land use is clearly brought out in these maps. As would be expected, little if any erosion occurs under woodland cover, while the most severe erosion is found on poorly cultivated areas which are now used either for pasture or have been abandoned entirely. In Marshall County 27.4 per cent of the area of one farm was found to be actively eroding. Another area proved to be 19.7 per cent eroded. In Lafayette County portions of two farms considered average for the district are 11.8 per cent and 9.2 per cent eroded.

Through the courtesy of the Bureau of Agricultural Economics, a crop-meter was loaned to the Station for use in making an extensive survey of soil erosion in several counties of northern Mississippi. This instrument has been used by the Bureau in making extensive crop surveys. It is attached to the speedometer of a car and by the operation of 12 keys a tally of crops or land use may be obtained while traveling along the road. The crop-meter has already been used in making a survey of soil erosion in the State of Oklahoma.

During the third week of August, Meginnis and Sinclair covered

Carroll, Lafayette, and Marshall Counties in northern Mississippi, with the crop-meter in operation. This survey will be extended to other counties of the silt loam uplands of that state.

Sinclair spent the last week of August in the office, and part of the time was devoted to working up the data collected with the crop-meter. The results for two of the most severely eroded counties in Mississippi are as shown in the following table:

SOIL EROSION SURVEY IN MISSISSIPPI

Summary of results with crop-meter showing distribution of varying types of land in per cent.

LAND CLASSIFICATION	BROWN LOAM SOIL AREA		COASTAL PLAIN SOIL AREA	
	Marshall County	Lafayette County	Marshall County	Lafayette County
Cultivated Land				
1. No erosion	21.7	18.0	13.2	18.2
2. Terraced	---	---	---	0.2
3. Sheet erosion	9.4	10.4	19.4	12.8
4. Gullied	---	0.2	---	---
Pasture Land				
5. Eroded	9.4	9.9	6.2	3.9
6. No erosion	9.1	9.2	5.1	9.9
Abandoned Land				
7. Eroding	14.4	9.6	8.5	6.8
8. Not actively eroding	13.7	10.2	9.0	7.9
9. Due to other causes	7.6	7.9	7.4	9.0
Woodland				
10. Bottomland	3.6	5.0	5.0	1.7
11. Upland	11.1	19.6	26.2	29.6
Eroding (all classes)	34.2	30.1	34.1	23.5
Basis For Above Figures In Miles				
Total distance traveled	134.1	102.1	67.5	70.8
12. Rivers, towns and non-visible	24.4	21.1	14.7	7.7
Actual Basis of Tally	109.7	81.0	52.8	63.1

Pathology

A series of large scale dipping tests for the prevention of sap stain in lumber was completed. Tests of log sprays and end coatings were started by temporary assistants Dale Chapman and W. Bramble. Laboratory tests relative to the comparative durabilities of steamed and unsteamed sap gum, and the effect of blue-stain in wood as regards water-absorbing qualities, were also begun.

Siggers has been making cultures in the Laboratory to produce fruiting bodies of fungi obtained in the study of butt-rot decay in Arkansas shortleaf. Work has also been started to identify fungi growing in the heartwood of fifteen pine stumps collected near Urania. Remeasurements were made of heights of 2,100 longleaf pine seedlings, 1,200 of which have been sprayed for three growing seasons and 900 left unsprayed. A summary of these height measurements will be made to determine the effect of the control of the longleaf pine needle disease on development of the seedlings.

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RESEARCH ACTIVITIES in R-2

Most of Roeser's time during the month was spent in the field, on the Gunnison, Uncompahgre, and Montezuma Forests.

The principal problem in connection with the Gunnison visit was to determine whether the area known as Block B, which had from 1909 to 1926 served the purpose of the experiment reported by Messrs. Bates, Hilton and Krueger under "Experiments in the Silvicultural Control of Natural Reproduction of Lodgepole Pine in the Central Rocky Mountains" (Journal of Agriculture, Res. 2/15/29) would be adaptable for the purpose of a growth study of lodgepole pine following selection and clear-cutting of this species in central Colorado. Inspection of the old plots indicated that they are in good condition, and with little extra work, can be used for the above mentioned study. In reality, the contemplated project would be but a continuation of the original study to a more practical end.

Time was also taken to procure volumetric measurements sufficient for constructing a volume table for determining increments on the three lodgepole pine thinning plots (Block A) near Pitkin. A rather curious phenomenon was noted on trees in the heavily thinned plot (thinned in 1912). Probably 80% of the trees are affected by a condition which induces a characteristic localized swelling of the stem, and which seems to bear a more or less intimate relationship to the opening up of the stand. Whether this condition is due to physiological or pathological causes is not known, but its occurrence and its effect upon growth and mortality will be closely observed

in subsequent examinations.

The questionable status of the administrative brush disposal experiment started in 1923 on South Quartz Creek was threshed out on the ground, and it was decided to abandon the original area and start a new experiment on a more representative site.

Before leaving the Gunnison, Roeser had an opportunity to contact some of the members of the Rocky Mountain Biological Station, a private ecological research organization with field headquarters at Gothic. The Quigley Creek Research Reserve site, which was recommended for withdrawal by the Investigative Committee last winter, and which is located within a short distance of Gothic, was visited and the most desirable location of its boundaries was outlined.

On the Uncompahgre Forest, a brief visit was made to the experimental planting and grazing damage and control plots near the Transfer Ranger Station, one of the nine proposed research centers within the Region. While the primary purpose of this visit was to standardize the technique employed in carrying out a test on the influence of oak brush upon planted western yellow pine, it afforded an opportunity to view the excellent results obtained in planting this species under heavy oak-brush on the Uncompahgre Plateau, and gave reason for believing that the extension of the western yellow pine type into the oak-brush type in this region is quite feasible.

Incidentally, the two plots upon which are being studied the effect of cattle grazing upon planted stock were also inspected, and the better development of the trees on the unprotected plot, as reported by local officers, was found to be no myth. No grazing damage of any kind was found on this plot, which is on the edge of a cattle driveway and as a result is fairly heavily grazed.

On the 13th, Roeser tied in with Supervisor Hoffman, of the Montezuma, and his technical assistant, W. Schipull, at Barlow Creek, which is under contract to the Colorado Spruce Company for the removal of spruce-fir sawlog and pulpwood material. A couple of days were spent in looking over the timber stand and an area was ultimately selected which satisfied most completely all the conditions desired for establishing a series of four one acre plots on a typical spruce-fir site, upon which cutting methods for the utilization of pulp-wood can be studied. This project was first proposed in 1928, and was approved in 1929 by the Regional Investigative Committee. Initiation of the experiment has been held up because cutting operations have been delayed. With the recent five and a half million dollar sale of Rio Grande - San Juan pulpwood timber to the International people, attention has been focused upon the spruce forests of the Central Rocky Mountains as a future source of pulpwood, and the value of this species is enormously enhanced. The need for immediately starting cutting method and growth studies in order to establish principles upon which to base management practice in this type, especially in

the southwestern part of the Region where present pulpwood activities are concentrated, is apparent.

Four plots were laid out, each five chains long and two chains wide. One of these will be left in its virgin condition to serve as a control, the others were marked on the basis of sawlog, conservative pulpwood (present marking practice), and heavy pulpwood utilization. All preliminary work relative to making an inventory of the stand on each of the plots was accomplished during the ten-day period given to the work. The party was augmented on the 19th by Mr. Thompson of the Office of Management. Following a discussion of objectives, it was decided to change the designation from Mt-146 to Mc-146, Montezuma.

Before quitting the Montezuma, advantage was taken of the opportunity of establishing direct field contact with Management, to visit old sale areas in the western yellow pine and spruce types in order to get some first hand evidence of growth following cutting and the progress of natural reproduction on such areas. The administrative plots near Dolores in sapling western yellow pine, to study the effect of thinnings, were also visited.

Returning to Colorado Springs on August 25, Roeser spent the rest of the month in completing the reproduction counts on the series of individual quadrats within cut-over Block C of the Fremont demonstration forest. No time was found to establish the additional quadrats proposed in the M-1 study, but this work will be undertaken during the first week of September.

The most severe hail storm in years passed over the Fremont Station on August 5, and left in its wake a badly battered and shattered greenhouse, and numerous broken thermometers. The latter were in use in the type and climatic study. By judiciously distributing the undamaged instruments and the surplus stock over the various field stations, the Fremont observer succeeded in keeping the record intact with the exception of about one-half of the maximum surface soil temperatures for the 5th.

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IN PRINT

Bates, C. G. — "The Production, Extraction, and Germination of Lodgepole Pine Seed." (Tech. Bul. 191)

Day, Ralph K. — "Grazing Out the Birds." (Amer. For. and For. Life, Sept. 1930)

Mowat, E. L. — "The Upper Peninsula Forest Experiment Station: What It Is and What It Does." (Pub. by Upper Peninsula Development Bureau)

Show, S. B. and Kotok, E. I. — "The Determination of Hour Control for Adequate Fire Protection in the Major Cover Types of the California Pine Region." (Tech. Bul. 209)

Wahlenberg, W. G. — "Experiments in the Use of Fertilizer in Growing Forest Planting Material at the Savenac Nursery." (Dept. Cir. 125)

MANUSCRIPTS

WASHINGTON OFFICE

W. R. Hine and E. N. Munns - "Some Early Society History." (Jour. of For.)

APPALACHIAN

E. H. Frothingham - "Forest Fire Research." (Address before Forest Fire Control Conference, Ridgecrest, N. C., August 25, 1930.

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Woods Waste Studies

During the month of August Mr. Anderson and Field Assistant Ibenthal conducted some very interesting studies of two portable tie mill operations cutting under Great Northern Railway contracts. All logs under these contracts are bucked into 8½-foot lengths in the woods and skidded from an average maximum distance of 1200 feet to the mill "set-up." Data were recorded by inch diameter classes on log description, scale, etc., sawing time, footage of side lumber waster, yield of slabs, yield of sawdust and yield of ties by grades.

Data on yield of ties and side lumber waste have not yet been computed but tentative calculations indicate a yield of 35 cords of slabs and 6 units (200 cubic feet) of sawdust for each 1,000 ties. Since an average of 24 ties per M feet log scale are sawed the yield of slabs and sawdust per M feet of logs is .84 cords and .14 units respectively. At first glance the huge piles of coarse sawdust and thick slabs indicate a tremendous waste, and so it is if the product of the log is considered as lumber only. However, on those operations where a local market exists for the slabs and sawdust there is less woods and mill waste then on a big mill operation, and the normally efficient operator can show a reasonable profit in larch and Douglas fir timber at the present time while the big mill usually operates at a loss.

One small outfit operating in larch-Douglas fir set-up 6 miles from Kalispell, Montana, has a ready market in Kalispell for slabs at $4.00 per cord and sawdust at $3.50 per unit delivered. Or they have ready sale at the mill for slabs at $2.00 per cord and sawdust at $0.75 per unit. Thus, the waste from a thousand feet of logs nets the operator $1.81 at the mill.

It is felt that the portable tie mill is with us for good. Such being the case it is to the interest of the Forest Service that they increase their operating efficiency and reduce waste. That there is room for an increase in operating efficiency is indicated by the wide variation in daily output. The average mill cuts from 350 to 400 ties per day. One especially well equipped and efficiently operated mill averaged 800 ties per day for the month of July and made a record cut of 1,270 ties in 9 hours on a wager.

Selective Logging

Some of the early operations of the Big Blackfoot Milling Company (now owned by the Anaconda Copper Mining Company) near Greenough, Montana, are excellent examples of timber "high grading." Thirty-five years ago very few trees under 14 inches were cut and most of the

larger trees of poor quality were left. Top diameter utilization averaged from 14 to 21 inches. The A.C.M. Company has just recently relogged some 2,000 acres of these old cuttings. Approximately 4,000 feet board measure log scale per acre were cut according to company records.

According to stump analyses made on the relogged area by Messrs. Weidman and Anderson the small western yellow pine trees passed up 35 years ago have increased from four to seven inches in diameter, or approximately 1½ inches per decade. This is a good growth acceleration after partial cutting for this region and along with an excellent stand of western yellow pine pole size reproduction on the area presents a rosy picture indeed.

Selective logging to date in the western yellow pine type of this region has been viewed somewhat skeptically by some Foresters as a revived form of high-grading. On with the revival if it means more areas like the A.C.M. relogged lands.

Fire Detail

Mr. Whitney drew his first fire detail of the 1930 season on July 31, being assigned with two other Regional officers to the Coolwater fire on the Selway Forest. Leaving Missoula by plane at 4:10 p.m. the men flew over the rugged wilderness areas of the Clearwater and Selway Forests, scouted the fire, and landed at Grangeville, Idaho, at 5:30 p.m. The trip from there was continued by car, the men arriving at the Pete King Ranger Station, which was but a few hours hike from the fire, early the same evening. By use of the plane the three men were able to reach the fire 24 hours earlier than would have been possible by train and car travel. Mr. Whitney reported a very enjoyable and comfortable trip down in the plane.

Mr. Whitney had charge of a sector of the fire and remained until the whole fire was under control. He returned to the office on August 9.

On Sunday August 24 Mr. Anderson, accompanied by his field assistant Wm. Ibenthal, left for a fire detail on the Lolo Forest. Mr. Anderson reported the fire under control on the 26th and returned to the office on the afternoon of the 27th.

Lumber Census

Returns were secured from the five North Idaho concerns which had delayed the completion of the canvass the preceding month. About 150 schedules on hand at the time of Whitney's fire detail were edited and tabulated. The last of the schedules for both Idaho and Montana

were mailed to the Forester on August 29.

The 1929 lumber production figures resulting from a final check of our tabulation sheets are as follows:

Lumber Cut - M Ft. B.M.

(Mills cutting less than 50 M during year excluded)

Species	Idaho	Montana	Combined Cut Volume	%
Idaho White Pine	437,568	21,677	459,245	32.4
Western Yellow Pine	287,611	169,653	457,264	32.3
Western Larch	83,082	104,949	188,031	13.3
Douglas Fir	108,776	72,817	181,593	12.8
White Fir	88,793	105	88,898	6.3
Cedar	12,047	36	12,083	0.8
Spruce	6,244	16,183	22,427	1.6
Lodgepole Pine	3,274	2,795	6,069	0.4
Hemlock	1,418	0	1,418	0.1
Cottonwood	57	45	102	0
Total	1,028,870	388,260	1,417,130	100.00
Lath M pcs	91,814	17,003		
Shingles, M pcs	18,089	20		

Idaho and Montana mills cutting less than 50 M produced 2,182 M feet in addition to the above combined total. There were 53 mills in Idaho and 42 mills in Montana which produced less than 50 M feet. Including these small mills the 1929 aggregate was 1,030,129 M feet in Idaho and 389,183 M feet in Montana.

The following table compares production for the last 9 years including totals for all mills in Idaho and Montana cutting 50 M feet and over per year.

Year	Idaho Cut M Feet	Montana Cut M Feet	Combined Total Cut M Feet
1921	542,620	213,989	756,609
1922	857,581	303,458	1,161,039
1923	1,072,930	426,917	1,499,847
1924	1,017,960	350,335	1,368,295
1925	1,140,575	388,854	1,529,429
1926	947,471	378,698	1,326,169
1927	923,986	396,267	1,320,253
1928	977,468	387,879	1,365,347
1929	1,028,870	388,260	1,417,130

Comparing production for the last two years the 1929 totals show an increase of 5.2% for Idaho and for Montana a very slight increase amounting to approximately one-tenth of one per cent.

Lumber Prices & Movement

Av. Mill-Run Prices	Annual, 1929	1st Q., 1930	2nd Q., 1930
Idaho White Pine	$34.44	$35.33	$34.28
Western Yellow Pine	26.17	24.57	23.29
Larch-Fir	20.29	18.35	18.28
White Fir	20.94	19.45	19.45
Spruce	24.23	23.51	22.76

Shipment and Cut	1929	1930
Shipment	158,802	116,629
Cut	175,209	138,964

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OFFICE OF FOREST PRODUCTS, R-6

Branch of Research: Office of Products

Felling and Bucking Study, Douglas Fir Region.

Spelman and Johnson spent the entire month in the field, completing Plot 4 at the logging operation of the White Pine Lumber Company, Enumclaw, Washington. The area included about two acres and 258 trees; Douglas fir, 106; western hemlock, 92; western red cedar, 6; and Douglas fir snags, 51. The Douglas fir ranged from 19 to 48 inches, mostly from 23 to 36 inches. The western hemlock ranged from 10 to 40 inches, with most of the trees of this species falling between 10 and 22 inches. The dominant Douglas fir trees averaged about 180 feet in height, while the hemlock ranged from 100 to 150 feet. The average age of the Douglas fir was around 255 years.

The plan is for Spelman and Johnson to spend all of September in the field.

In the course of the study Spelman has been impressed with the hard physical labor involved, particularly in wedging or where pitch is encountered in sawing. And it is more than a matter of loss in output. The better fallers are willing to do the heavy work of wedging, where possible, to save the timber, but many fallers do not take advantage of the best ground because of the hard labor involved.

The hard physical labor clearly runs counter to the best possible work, and consequently any improvements in present day tools which would reduce the amount of hard labor would contribute greatly to better workmanship and less breakage.

Spelman has been interested in learning the attitude of the workers toward improved tools, such as power saws or mechanical devices to supplant wedging. Almost invariably, fallers, buckers, bull buckers, and filers, who have direct contact with the work in the woods, are skeptical of improvements over present day tools. The use of power saws, such as the Wolf chain saw, is in their opinion quite impractical in large timber. The workers almost seem to have a prejudice against improvements and certainly very little hope for better tools, much less any desire to invent something better.

Survey of Sawmill Waste in the Douglas Fir Region.

Hodgson spent practically all of the month of August in the field looking over sawmills and talking to managers for the purpose of selecting six Douglas fir mills to be studied intensively this fall as a part of the sawmill waste survey. The selection of representative sawmills, adaptable to the survey was made difficult for the reason that so many mills have stopped running. In the Grays Harbor region for example, where normally there are between twenty-five and thirty mills in operation, all except three or four have closed down and two of these are hemlock mills, running on a curtailed program.

The six sawmills selected for study include two in Oregon and four in Washington. Two of the mills operate circular headsaws while the other four break down the logs with band headsaws.

1929 Census of Lumber, Lath, Shingles, Logs, Cooperage and Veneer

Much of Gibbons' time was devoted to this survey. At the close of August, 2071 reports had been mailed to Washington, of which 646 were forwarded during that month.

Insulator and Sound Deadener Made from Douglas Fir Sawmill Waste

Portland business and professional men, 1000 or more of them, turned out during August to greet "Oregon's newest super-industry," the plant of the Fir-tex Insulating Board Co., St. Helens, Oregon. The plant is now producing 150,000 square feet of semi-rigid, one-inch thick, non-laminated insulator and sound deadener from unbarked slabs, edgings and trimmings. All that now remains to make this

venture a huge success is a strong and satisfactory market for the product, for the wood waste from the mills of the Douglas fir region afford ample raw material for a score or more of such plants. Fir-tex looks like a first-class insulator and sound deadener, and its production unquestionably points the way toward complete utilization of the entire tree.

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FOREST TAXATION INQUIRY

Miss Martha S. Epps, who has had charge of the statistical work for nearly three years, left during the month to take a position with Harvard University which enables her to continue her graduate studies. Miss Besse B. Day is now in charge of this department.

Hall was in Washington for two days in the early part of the month, checking up the Hollerith tabulation of North Carolina data and conferring with Mr. Steer in regard to the study of stumpage values.

Murphy spent two weeks at the New Haven office superintending the compilation of additional tables relating to the selected towns in New Hampshire.

Wager returned to North Carolina during the latter part of the month. He is continuing the North Carolina study from his headquarters at Chapel Hill, and also working on a portion of the final report. Thomson worked chiefly on the office end of the growth and assessment ratio studies which were conducted in the selected counties of North Carolina.

Preliminary drafts of portions of the final report were completed by Pingree and Murphy.

Fairchild spent the month in Honolulu, where he is advising the Territorial Government in regard to a revision of its system of taxation.

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